



US Army Corps of Engineers  
Baltimore District

# Draft Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement

Volume I – Text



F E B R U A R Y 2 0 0 5

Prepared by:  
Weston Solutions, Inc.  
West Chester, PA



# COVER SHEET

February 2005

## LEAD AGENCY

U.S. Department of Defense

**TITLE**    **Baltimore Harbor and Channels Dredged Material Management Plan and Draft Tiered Environmental Impact Statement.**

## CONTACT

Additional copies or information concerning this document can be obtained from Mr. Mark Mendelsohn, U.S. Army Corps of Engineers, Planning Division, P.O. Box 1715, Baltimore, MD 21203. Telephone: (410) 962-9499 or 1-800-295-1610.

## ABSTRACT

In accordance with the requirements of the National Environmental Policy Act, the U. S. Army Corps of Engineers (USACE), Baltimore District has prepared a Draft Tiered Environmental Impact Statement (DTEIS) and Dredged Material Management Plan (DMMP) to analyze dredged material placement for the Port of Baltimore for 20 years of maintenance and new work dredging. USACE is making the document available to the public for review and comment through a Notice of Availability published in the Federal Register. The overall goal of the DMMP is to develop a plan to maintain, in an economically and environmentally sound manner, channels necessary for navigation for the Port of Baltimore, conduct dredged material placement in the most environmentally sound manner, and maximize the use of dredged material as a beneficial resource. The recommendations that will provide a minimum of 20 years of dredged material placement capacity for the Port of Baltimore are:

- Continued use of open water placement in Virginia (Dam Neck Open Water Placement; Rappahannock Shoal Deep Alternate Open Water Placement; Wolf Trap Alternate Open Water Placement).
- Optimized use of existing dredged material management sites in Maryland, including Pooles Island Open Water Site, Hart-Miller Island Dredged Material Containment Facility, Cox Creek Confined Disposal Facility and Poplar Island Environmental Restoration Project (PIERP).
- Multiple confined disposal facilities for harbor material in Patapsco River.
- Poplar Island Environmental Restoration Project (PIERP) Expansion.
- Large Island Restoration-Middle Chesapeake Bay.
- Wetland Restoration-Dorchester County.

## **AVAILABILITY**

Copies are available for public review at the following public reading rooms.

- (1) Queen Anne's Public Library, Stevensville Branch, 200 Library Circle, Stevensville, MD 21666
- (2) Essex County Public Library, 1110 Eastern Boulevard, Baltimore, MD 21221
- (3) Anne Arundel County Public Library, 1410 West Street, Annapolis, MD 21401
- (4) St. Mary's County Public Library, 23250 Hollywood Road, Leonardtown, MD 20650
- (5) Somerset County Public Library, 11767 Beachwood St, Princess Anne, MD 21853
- (6) Dorchester County Public Library, 303 Gay St, Cambridge, MD 21613

## **PUBLIC COMMENTS**

The Department of the Army encourages public participation in the National Environmental Policy Act (NEPA) process. A Notice of Intent (NOI) to prepare an Environmental Impact Statement was published in the Federal Register in May 2002 and scoping meetings were held in June 2002. The public was invited to provide oral comments at the scoping meetings and to submit additional comments to the Baltimore District.

Two public meetings will be held in March 2005 for the Baltimore Harbor and Channels Dredged Material Management Plan and Draft EIS document. The first public meeting on the draft will be held at Queen Annes Public Library, Stevensville Branch, 200 Library Circle, Stevensville, Maryland 21666, on Monday March 7, 2005 beginning at 7 p.m. The second public meeting will be held at Essex Community College, 7201 Rossville Boulevard, Baltimore, Maryland 21237 in the Lecture Hall Building J on the first floor, on Thursday March 10, 2005 beginning at 7 p.m. Staff will be available one hour prior to meeting start time. Both meetings will provide an opportunity for the public to present oral and/or written comments. All persons and organizations that have an interest in the DMMP are urged to participate in one or both meetings.

The USACE must receive comments on or before March 28, 2005, to ensure consideration in the final plan. Please send written comments concerning this report to U.S. Army Corps of Engineers, Attn: Mr. Mark Mendelsohn, Planning Division, P.O. Box 1715, Baltimore, MD 21203. Telephone: (410) 962-9499 or 1-800-295-1610. Please submit electronic comments to [mark.mendelsohn@usace.army.mil](mailto:mark.mendelsohn@usace.army.mil). Your comment must be contained in the body of your message; please do not attach any files. Please include your name and address in your message. You may view the Draft TEIS and related information on our web page at <http://www.nab.usace.army.mil/projects/DMMP/index.html>. USACE has distributed copies of the Draft TEIS to appropriate members of Congress, State and local government officials, Federal agencies, and other interested parties.

After the public comment period ends on March 28, 2005, USACE will consider all comments received. The Draft TEIS will be revised as appropriate and a Final TEIS will be issued.

# TABLE OF CONTENTS

Section	Page
<b>ES EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>1. INTRODUCTION.....</b>	<b>1-1</b>
1.1 PURPOSE AND NEED.....	1-2
1.2 STUDY AUTHORITY.....	1-3
1.3 STUDY LIMITATIONS .....	1-5
1.4 AUTHORIZED FEDERAL PROJECTS.....	1-5
1.5 DESCRIPTION OF THE STUDY AREA .....	1-6
1.5.1 Chesapeake and Delaware (C&D) Canal Approach Channels .....	1-7
1.5.2 Harbor Channels .....	1-8
1.5.3 Chesapeake Bay Approach Channels (MD) .....	1-12
1.5.4 Chesapeake Bay Approach Channels (VA).....	1-14
1.6 LOCAL SPONSORS .....	1-16
1.6.1 State of Maryland's DMMP Process .....	1-17
1.7 DMMP STUDY PROCESS.....	1-18
<b>2. AFFECTED ENVIRONMENT .....</b>	<b>2-1</b>
2.1 PHYSICAL CONDITIONS OF THE CHESAPEAKE BAY .....	2-2
2.1.1 Upper Bay .....	2-3
2.1.2 Baltimore Harbor .....	2-5
2.1.3 Middle Bay.....	2-6
2.1.4 Lower Bay.....	2-8
2.2 GEOLOGY AND SOILS .....	2-10
2.2.1 Geology.....	2-10
2.2.2 Sediment .....	2-18
2.2.3 Soils.....	2-27
2.3 SURFACE WATER QUALITY.....	2-30
2.3.1 Upper Bay .....	2-34
2.3.2 Baltimore Harbor .....	2-36
2.3.3 Middle Bay.....	2-38
2.3.4 Lower Bay.....	2-41
2.3.5 Floodplains.....	2-45
2.3.6 Groundwater .....	2-45
2.4 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE.....	2-46
2.5 AIR QUALITY.....	2-50
2.5.1 Upper Bay .....	2-50
2.5.2 Baltimore Harbor .....	2-51

---

## TABLE OF CONTENTS (Continued)

---

2.5.3	Middle Bay.....	2-51
2.5.4	Lower Bay.....	2-52
2.6	AQUATIC RESOURCES .....	2-52
2.6.1	Benthic Invertebrates .....	2-54
2.6.2	Oysters .....	2-61
2.6.3	Soft-Shell Clams .....	2-65
2.6.4	Blue Crab .....	2-67
2.6.5	Finfish .....	2-71
2.6.6	Essential Fish Habitat .....	2-76
2.6.7	Submerged Aquatic Vegetation .....	2-79
2.6.8	Marine Mammals .....	2-84
2.7	WETLANDS.....	2-84
2.7.1	Upper Bay .....	2-88
2.7.2	Baltimore Harbor .....	2-88
2.7.3	Middle Bay.....	2-88
2.7.4	Lower Bay.....	2-89
2.8	TERRESTRIAL RESOURCES.....	2-89
2.8.1	Mammalian Habitats .....	2-92
2.8.2	Avian Habitats .....	2-94
2.8.3	Herpetile Habitats .....	2-99
2.8.4	Additional Wildlife Concerns .....	2-101
2.9	RARE, THREATENED, AND ENDANGERED (RTE) SPECIES.....	2-102
2.9.1	Upper Bay .....	2-103
2.9.2	Baltimore Harbor .....	2-105
2.9.3	Middle Bay.....	2-106
2.9.4	Lower Bay.....	2-107
2.10	RECREATION .....	2-109
2.10.1	Parks.....	2-110
2.10.2	Sport Fishing.....	2-111
2.10.3	Boating.....	2-112
2.10.4	Other Recreation Resources.....	2-112
2.10.5	Wild and Scenic Rivers.....	2-113
2.11	CULTURAL RESOURCES .....	2-113
2.12	SOCIOECONOMICS .....	2-113
2.12.1	Population .....	2-114
2.12.2	Employment and Income .....	2-118
2.12.3	Environmental Justice.....	2-121
2.13	TRANSPORTATION.....	2-124
2.13.1	Port of Baltimore.....	2-124
2.14	NOISE.....	2-125

---

## TABLE OF CONTENTS (Continued)

---

2.15	DREDGING NEEDS.....	2-127
<b>3.</b>	<b>ALTERNATIVES .....</b>	<b>3-1</b>
3.1	“NO ACTION” ALTERNATIVE .....	3-1
3.2	DREDGED MATERIAL PLACEMENT ALTERNATIVES CONSIDERED .....	3-5
3.2.1	Existing Sites .....	3-6
3.2.2	New Sites or Expanded Existing Sites.....	3-10
3.2.3	Innovative Uses.....	3-35
3.3	SCREENING PROCESS.....	3-44
3.3.1	Methodology .....	3-44
3.3.2	Environmental Impact Evaluation .....	3-45
3.3.3	Capacity Evaluation .....	3-51
3.3.4	Cost Evaluation.....	3-52
3.3.5	Technical and Logistical Risk Evaluation .....	3-53
3.3.6	Acceptability Risk Evaluation .....	3-54
3.3.7	Screening Summary .....	3-56
3.4	TRADE-OFF ANALYSIS.....	3-56
3.4.1	Alternative Suite Formulation.....	3-56
3.4.2	Suite Analysis .....	3-61
3.5	FEDERAL STANDARD.....	3-63
3.5.1	C&D Canal Approach Channels—Pooles Island .....	3-64
3.5.2	Harbor Channels—HMI.....	3-64
3.5.3	Chesapeake Bay Approach Channels (MD)—Deep Trough .....	3-64
3.5.4	Chesapeake Bay Approach Channels (VA).....	3-65
3.5.5	Economic Justification of Continued Maintenance .....	3-65
3.6	RECOMMENDED PLAN.....	3-67
<b>4.</b>	<b>ENVIRONMENTAL CONSEQUENCES .....</b>	<b>4-1</b>
4.1	PHYSICAL CONDITIONS.....	4-3
4.1.1	Maintenance Dredging.....	4-3
4.1.2	Recommended Plan .....	4-5
4.2	GEOLOGY AND SOILS .....	4-6
4.2.1	Maintenance Dredging.....	4-6
4.2.2	Recommended Plan .....	4-6
4.3	WATER QUALITY.....	4-9
4.3.1	Maintenance Dredging.....	4-9
4.3.2	Recommended Plan .....	4-11
4.3.3	Floodplain .....	4-14
4.4	HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) .....	4-16

---

## TABLE OF CONTENTS (Continued)

---

4.4.1	Maintenance Dredging.....	4-16
4.4.2	Recommended Plan .....	4-17
4.5	AIR QUALITY IMPACTS.....	4-18
4.5.1	Maintenance Dredging.....	4-19
4.5.2	Recommended Plan .....	4-20
4.6	AQUATIC RESOURCES .....	4-21
4.6.1	Maintenance Dredging.....	4-21
4.6.2	Recommended Plan .....	4-24
4.7	WETLANDS.....	4-37
4.7.1	Maintenance Dredging.....	4-37
4.7.2	Recommended Plan .....	4-37
4.8	TERRESTRIAL RESOURCES.....	4-42
4.8.1	Maintenance Dredging.....	4-42
4.8.2	Recommended Plan .....	4-43
4.9	RARE, THREATENED, AND ENDANGERED (RTE) SPECIES.....	4-46
4.9.1	Maintenance Dredging.....	4-46
4.9.2	Recommended Plan .....	4-49
4.10	RECREATION .....	4-51
4.10.1	Maintenance Dredging.....	4-51
4.10.2	Recommended Plan .....	4-52
4.10.3	Wild and Scenic Rivers.....	4-54
4.11	CULTURAL RESOURCES .....	4-54
4.11.1	Maintenance Dredging.....	4-55
4.11.2	Recommended Plan .....	4-55
4.12	SOCIOECONOMICS .....	4-58
4.12.1	Overview.....	4-58
4.12.2	Sources of Impacts.....	4-59
4.12.3	Recommended Plan .....	4-60
4.13	TRANSPORTATION.....	4-61
4.13.1	Maintenance Dredging.....	4-61
4.13.2	Recommended Plan .....	4-63
4.14	NOISE.....	4-65
4.14.1	Maintenance Dredging.....	4-65
4.14.2	Recommended Plan .....	4-66
4.15	SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY.....	4-68
4.15.1	Maintenance Dredging.....	4-68
4.15.2	Recommended Plan .....	4-68
4.16	IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES .....	4-69

---

## TABLE OF CONTENTS (Continued)

---

4.16.1	Maintenance Dredging.....	4-69
4.16.2	Recommended Plan .....	4-69
4.17	CUMULATIVE EFFECTS AND MITIGATION.....	4-70
4.17.1	The DMMP/EIS Cumulative Effects.....	4-70
4.17.2	Cumulative Effects.....	4-71
4.17.3	Mitigation.....	4-77
<b>5.</b>	<b>IMPLEMENTATION .....</b>	<b>5-1</b>
5.1	RECOMMENDED PLAN.....	5-1
5.2	FINALIZING THE EIS .....	5-4
5.3	DMMP REVIEWS.....	5-4
<b>6.</b>	<b>RECOMMENDATIONS.....</b>	<b>6-1</b>
<b>7.</b>	<b>LIST OF PREPARERS.....</b>	<b>7-1</b>
<b>8.</b>	<b>DISTRIBUTION LIST.....</b>	<b>8-1</b>
<b>9.</b>	<b>REFERENCES.....</b>	<b>9-1</b>

---

## LIST OF APPENDICES

---

**APPENDIX A—DREDGING NEEDS SUPPLEMENTAL INFORMATION**

**APPENDIX B—BAY ENHANCEMENT WORKING GROUP ENVIRONMENTAL  
SCORING**

**APPENDIX C—COST ESTIMATE SPREADSHEETS**

**APPENDIX D—SUMMARY OF ESSENTIAL FISH HABITAT AND GENERAL  
HABITAT PARAMETERS FOR FEDERALLY MANAGED SPECIES**

**APPENDIX E—CULTURAL RESOURCES STUDY**

**APPENDIX F—ECONOMIC JUSTIFICATION**

**APPENDIX G—PRELIMINARY ASSESSMENT**

**APPENDIX H—PUBLIC INVOLVEMENT**



---

## LIST OF ACRONYMS

---

AE&D	advance engineering and design
AIC	Artificial Island Creation
AIRFA	American Indian Religious Freedom Act
APE	area of potential effect
ASMFC	Atlantic States Marine Fisheries Commission
bcy	billion cubic yards
BEWG	Bay Enhancement Working Group
B-IBI	Benthic Index of Biotic Integrity
BMP	best management practice
bp	before present
bu	bushels
C&D	Chesapeake and Delaware
CAA	Clean Air Act
CAC	Citizens' Advisory Committee
CAD	confined aquatic disposal
CDF	confined disposal facility
CBP	Chesapeake Bay Program
CBBMP	Chesapeake Bay Benthic Monitoring Program
CBBT	Chesapeake Bay Bridge-Tunnel
CBSAC	Chesapeake Bay Stock Assessment Committee
CE	cost effectiveness analysis
CENAB	U.S. Army Corps of Engineers, Baltimore District
CENAO	U.S. Army Corps of Engineers, Norfolk District
CENAP	U.S. Army Corps of Engineers, Philadelphia District
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CHKOH	Chickahominy River
CO	carbon monoxide
CQE	Council on Environmental Quality
CRRMH	Corrotoman River
CWA	Clean Water Act
cy	cubic yard
dB	decibel
dBA	weighted-A decibel scale
DMA	Dredged Material Area

---

## LIST OF ACRONYMS (Continued)

---

DMCF	Dredged Material Containment Facility
DMMP	Dredged Material Management Program
DN	disseminated neoplasia
DO	dissolved oxygen
E	endangered
E&S	erosion and sedimentation
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPCRA	Emergency Planning and Community Right to Know Act
EPW	Evaluation for Planned Wetlands
ER	Engineering Regulation
ESA	Endangered Species Act
ESC	Erosion and Soil Control
ETM	Estuarine Turbidity Maximum
FE	federally endangered
FEMA	Federal Emergency Management Agency
FPP	Farmland Protection Policy
FMP	Fishery Management Plan
FT	federally threatened
ft/s	feet/second
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information System
gpm	gallons per minute
GRR	General Re-evaluation Report
HAPC	Habitat Areas of Potential Concern
HEP	Habitat Evaluation Procedure
HMI	Hart-Miller Island
HTRS	hazardous, toxic, and radioactive substance
HTRW	hazardous, toxic, and radioactive waste
HUD	Department of Housing and Urban Development
ICA	incremental cost analysis
ITM	Inland Testing Manual
ITR	Independent Technical Review
lf	linear feet
LID	low-impact development

---

## LIST OF ACRONYMS (Continued)

---

LIR	Large Island Restoration
LWCFA	Land and Water Conservation Fund Act
ma	million years ago
MAFMC	Mid-Atlantic Fishery Management Council
MACEJ	Maryland Advisory Council on Environmental Justice
MBWSR	Minnesota Board of Water and Soil Resources
mcy	millions in cubic yards
MD DNR	Maryland Department of Natural Resources
MDE	Maryland Department of the Environment
mg/L	milligrams per liter
MGS	Maryland Geological Survey
MHT	Maryland Historic Trust
MinRAM	Minnesota Routine Assessment Method for Evaluating Wetland Functions
MLLW	mean lower low water
MNRP	Maryland Natural Resources Police
MPA	Maryland Port Administration
MPRSA	Marine Protection, Research, and Sanctuaries Act
msl	mean sea level
NAAQS	national ambient air quality standard
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NCDC	National Climatic Data Center
NCDEHNR	North Carolina Department of Environment, Health, and Natural Resources
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nm	nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOB	natural oyster bar
Norfolk DMA	Norfolk Ocean Dredged Material Area
NOx	nitrogen oxides
NPL	National Priorities List
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places

---

## LIST OF ACRONYMS (Continued)

---

NWR	National Wildlife Refuge
O&M	operation and maintenance
MNR	Ministry of Natural Resources
PA	Preliminary Assessment
PADEP	Pennsylvania Department of Environmental Protection
PAHs	polycyclic aromatic hydrocarbons
PELs	probable effects levels
PGL	Planning Guidance Letter
PIERP	Poplar Island Environmental Restoration Project
PM	particulate matter
PMP	Project Management Plan
PPA	Pollution Prevention Act
psu	practical salinity unit
QA/QC	quality assurance/quality control
RCRIS	Resource Conservation and Recovery Information System
ROD	Record of Decision
RPPMH	Lower Rappahannock River
RPPTF	Upper Rappahannock River
RTE	rare, threatened, and endangered
SAFMC	South Atlantic Fisheries Management Council
SAV	submerged aquatic vegetation
SC	special concern
sf	square feet
SHPO	State Historic Preservation Office
SIR	Small Island Restoration
SO <sub>x</sub>	sulfur oxides
SNS	shortnose sturgeon
SRBC	Susquehanna River Basin Commission
SSPRA	Sensitive Species Project Review Areas
SWH	shallow water habitat
T	threatened
TCE	trichloroethene
TELs	threshold effects levels
TMDL	total maximum daily load
TOC	total organic carbon

---

## LIST OF ACRONYMS (Continued)

---

TPH	total petroleum hydrocarbons
TRI	Toxic Release Inventory
TSS	total suspended solids
U.S. EPA	U.S. Environmental Protection Agency
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VADEQ	Virginia Department of Environmental Quality
VDCR	Virginia Department of Conservation and Recreation
VESCL&R	Virginia Erosion and Sediment Control Law, Regulations, and Certification Regulations
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VNRHP	Virginia Natural Resources Heritage Program
VOC	volatile organic compound
WCSC	Waterborne Commerce Statistical Center
WET	wetland evaluation technique
WQI	Wetland Quality Index
WRAP	Wetland Rapid Assessment Procedure
WRDA	Water Resources Development Act
WWTP	wastewater treatment plant

---

## LIST OF ACRONYMS (Continued)

---

TMDL	total maximum daily load
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRI	Toxic Release Inventory
TSS	total suspended solids
U.S. EPA	U.S. Environmental Protection Agency
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VADEQ	Virginia Department of Environmental Quality
VDCR	Virginia Department of Conservation and Recreation
VESCL&R	Virginia Erosion and Sediment Control Law, Regulations, and Certification Regulations
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VNRHP	Virginia Natural Resources Heritage Program
VOC	volatile organic compound
WCSC	Waterborne Commerce Statistical Center
WET	wetland evaluation technique
WQI	Wetland Quality Index
WRAP	Wetland Rapid Assessment Procedure
WRDA	Water Resources Development Act
WWTP	wastewater treatment plant

---

## LIST OF TABLES

---

### Title

Table 1-1	C&D Approach Channels Federally Authorized Maintenance Dredging
Table 1-2	Harbor Channels Federally Authorized Maintenance Dredging
Table 1-3	Baltimore Harbor Anchorages Federally Authorized Maintenance Dredging
Table 1-4	Chesapeake Bay Approach Channel (MD) Federally Authorized Maintenance Dredging
Table 1-5	Virginia Channels Federally Authorized Maintenance Dredging
Table 2-1	Status and Trends for Fixed Benthic Monitoring Sites in the Chesapeake Bay (1985-2001)
Table 2-2	Commercial Landings of Oysters in the Chesapeake Bay
Table 2-3	Commercial Landings of Soft-Shell Clams in the Chesapeake Bay
Table 2-4	Temporal Distribution and Relative Abundance of Fish in the Chesapeake Bay Mainstem
Table 2-5	Fisheries Managed by the Mid-Atlantic Fisheries Management Council
Table 2-6	Commercial Landings of Finfish in the Upper Chesapeake Bay
Table 2-7	Commercial Landings of Finfish in the Harbor Channels
Table 2-8	Commercial Landings of Finfish in the Middle Chesapeake Bay
Table 2-9	Commercial Landings of Finfish in the Lower Chesapeake Bay
Table 2-10	Fish Species with EFH for Mainstem of Chesapeake Bay - Maryland and Virginia
Table 2-11	Fish Species with EFH in MD Tributaries (Choptank River, Potomac River, Patuxent River, and Chester River, Maryland)
Table 2-12	Fish Species with EFH in James River, Virginia
Table 2-13	Fish Species with EFH in Mouth of Chesapeake Bay (Southernmost Portion of Lower Bay)
Table 2-14	SAV Information Used for Evaluating Habitat Requirements—C&D Canal Approach Channels (Upper Bay)

---

## LIST OF TABLES (Continued)

---

Table 2-15	SAV Information Used for Evaluating Habitat Requirements—Harbor Channels
Table 2-16	SAV Information Used for Evaluating Habitat Requirements—Chesapeake Bay Approach Channels—MD (Middle Bay)
Table 2-17	SAV Information Used for Evaluating Habitat Requirements—Chesapeake Bay Approach Channels—VA (Lower Bay)
Table 2-18	Common Mammal, Bird, and Herpetile Species Observed or Expected in the Counties Bordering the Chesapeake Bay
Table 2-19	Species of Special Concern Potentially Present in the Counties Bordering the Upper Chesapeake Bay
Table 2-20	Species of Special Concern Potentially Present in Baltimore City
Table 2-21	Species of Special Concern Potentially Present in Counties Bordering the Middle Chesapeake Bay
Table 2-22	Species of Special Concern Potentially Present in Subwatersheds Bordering the Lower Chesapeake Bay
Table 2-23	Shortnose Sturgeon Captures in the Chesapeake Bay and Tributaries (last updated March 22, 2004)
Table 2-24	Summary of Demographics in Upper Bay Counties
Table 2-25	Summary of Demographics in Baltimore City
Table 2-26	Summary of Demographics in Middle Bay Counties
Table 2-27	Summary of Demographics in Lower Bay (VA)
Table 2-28	Selected Economic Characteristics for Upper Bay and Harbor Areas
Table 2-29	Selected Economic Characteristics of Middle Bay Counties (MD)
Table 2-30	Selected Economic Characteristics of Lower Bay Counties (VA)
Table 2-31	Stratigraphy of the Chesapeake Bay Miocene Epoch to Present—Stratigraphy Unit Correlation for Virginia and Maryland
Table 2-32	Stratigraphy of the Chesapeake Bay Miocene Epoch to Present—Stratigraphic and Hydrostratigraphic Units



---

## LIST OF TABLES (Continued)

---

Table 2-33	Chesapeake Bay Watershed Land-Based Sediment Loads and Cap Load Allocations
Table 2-34	Summary of Sediment Originating from Chesapeake Bay Watershed Sources
Table 2-35	Baltimore Harbor and Channels DMMP Projected Dredging Quantities (CY)
Table 2-36	Capacity of Existing Placement Sites as of August 2004
Table 3-1	USACE Baltimore Harbor and Channels DMMP Alternatives
Table 3-2	Ecosystem Assessment Methods
Table 3-3	Agencies and Organizations Participating in the Bay Enhancement Working Group (BEWG)
Table 3-4	BEWG Categories and Parameters
Table 3-5	BEWG Scores, Habitat Created, and Habitat Benefit Index for Each Federal DMMP Alternative
Table 3-6	Unit Cost, Capacity, and Normalized BEWG Score +1.91 for Federal DMMP Alternatives
Table 3-7	Summary of DMMP Alternative Contingency Factors
Table 3-8	16 June 2004 Management Roundtable Participants
Table 3-9	Qualitative Risk Rankings
Table 3-10	Quantitative & Qualitative Criteria Summary Table
Table 3-11	Comparison of Recommended Plan and Federal Standard
Table 4-1	Potential Species with EFH in the Project Areas
Table 4-2	State Impacts Per \$Million in Direct Spending
Table 4-3	Economic Impacts of PIERP Expansion (Average Annual Impacts Over 12 Years)
Table 4-4	Economic Impacts of Large Island Restoration in the Middle Bay (Average Annual Impacts Over 12 Years)

---

## LIST OF TABLES (Continued)

---

Table 4-5	Economic Impacts of Wetland Restoration in Dorchester County (Average Annual Impacts Over 12 Years)
Table 4-6	Economic Impacts of a Confined Disposal Facility Along the Patapsco River (Average Annual Impacts Over 5 Years)
Table 4-7	Authorized River and Harbor Projects
Table 7-1	DMMP/EIS Development Team

---

## LIST OF FIGURES

---

### Title

Figure 1-1	DMMP Framework
Figure 1-2	Chesapeake Bay Area
Figure 1-3	C&D Canal Approach Channels
Figure 1-4	Harbor Approach Channels
Figure 1-5	Chesapeake Bay Approach Channels (MD)
Figure 1-6	Chesapeake Bay Approach Channels (VA)
Figure 1-7	DMMP Process
Figure 2-1	Locations and Status of Fixed Benthic Monitoring Stations in the Chesapeake Bay
Figure 2-2	Oyster Bars
Figure 2-3	Soft-Shell Clam Abundance
Figure 2-4	Submerged Aquatic Vegetation
Figure 2-5	Major Pathways of Sediment Transport in Chesapeake Bay
Figure 2-6	Sediment Contribution of Patapsco/Back River By Source
Figure 2-7	Chesapeake Bay Monitoring Station Location Map
Figure 2-8	Status of Chemical Contaminant Effects on Living Resources in the Chesapeake Bay's Tidal Rivers
Figure 2-9	River Names
Figure 3-1	Upper Chesapeake Bay – Dredged Material Placement Alternatives
Figure 3-2	Chesapeake Mid-Bay – Dredged Material Placement Alternatives
Figure 3-3	Chesapeake Lower Bay – Dredged Material Placement Alternatives
Figure 3-4	Open Water Placement Methods
Figure 3-5	Placement Areas in the Pooles Island Vicinity

---

## LIST OF FIGURES (Continued)

---

- Figure 3-6 James Island Habitat Development Alignment 1
- Figure 3-7 Confined Aquatic Disposal
- Figure 3-8 Types of Confined Disposal Facilities
- Figure 3-9 Suites of Alternatives for Harbor Channels
- Figure 3-10 Suite of Alternatives with Reasonable Acceptability Risk for Harbor Channels
- Figure 3-11a All Suites for Combined C&D and Maryland Bay Approaches
- Figure 3-11b Remaining Suites for Combined C&D and Maryland Bay Approaches After Cost-Effectiveness Screening
- Figure 3-12 Suites with Reasonable Acceptability Risk for Combined C&D and Maryland Bay Approaches
- Figure 3-13 Cost-effective Suites with Reasonable Acceptability Risk Anchored by Large Island Restoration or PIERP
- Figure 3-14 Proposed Recommended Plan
- Figure 5-1 Implementation Schedule – Dredged Material Quantities (cy) by Placement Site